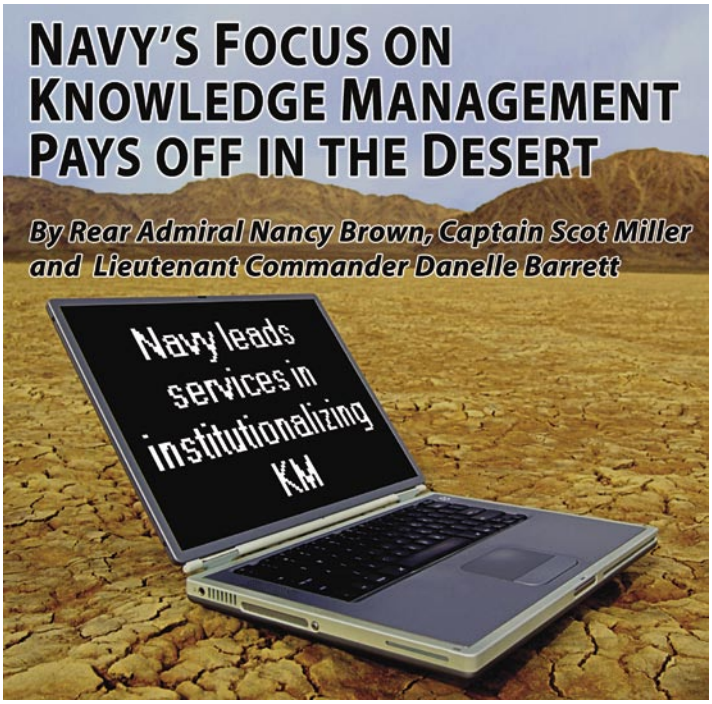

The Navy is creating knowledge-enabled organizations afloat and ashore. Since the late 1990s, proponents for knowledge management (KM) have emerged within the Navy. Commander, Pacific Fleet and Commander, Second Fleet assigned a knowledge manager to their staffs as early as 1998. Several key projects were implemented to address information management (IM), a subset of KM, and necessary precursor to success. This included Collaboration at Sea (CAS) to share information in the afloat environment and the Knowledge Wall and K-Web to improve situational awareness afloat.

In parallel, Navy and coalition networks afloat and ashore have advanced to better support these and other KM applications. The coalition wide-area networks afloat are now the primary warfighting networks used in Operations Iraqi Freedom and Enduring Freedom in Afghanistan. The Navy's early successes in KM have built a service culture of understanding and appreciation for KM which was transferred by Navy Information Professional (IP) officers to the ground war and nation-building efforts at Multi-National Force-Iraq.

While the Navy began KM early, the iterative progression of acceptance and concepts put into practice did not happen overnight or without growing pains. Recent events have codified and institutionalized KM across the Navy. In October 2001, the Navy established the IP Officer Community, an operationally oriented "Signal Corps" for the Navy. Career success as an IP derives from operational excellence in what was traditionally known as command, control, communications and computers (C4). Today, it encompasses many elements of information operations and management.

From its inception, KM was embraced as a core competency by the IP community. IPs now fill knowledge manager billets at sea, and based on demand from strike group commanders, increased their presence on strike group staffs from two in 2001 to 12 in 2005.

Fish Out of Water …

Navy officers in a ground war in Iraq? Some would compare them to "fish out of water." The exact opposite proved to be the case with their work of putting KM concepts into action in the desert. Rear Adm. Nancy Brown, the Navy's senior IP officer and one of its most experienced joint leaders, was assigned as the Deputy Chief of Staff for Communications and Information Systems for the Multi-National Force-Iraq (MNF-I) in August 2004. One of her first acts was to bring Navy IPs with KM experience to theater, and establish the MNF-I Knowledge Management Division. The strategic mission of MNF-I is:

"In partnership with the Iraqi Government, MNF-I conducts full spectrum counter-insurgency operations to isolate and neutralize former regime extremists and foreign terrorists, and organizes, trains and equips Iraqi security forces in order to create a security environment that permits the completion of the U. N. Security Council Resolution 1546 process on schedule."

MNF-I supports the maturation of Iraqi self-governance and assists with Iraqi economic redevelopment and many other aspects of nation building in support of democracy. As the senior military organization in Iraq, MNF-I also works closely with key stakeholders such as the United Nations, the U.S. Department of State and, most importantly, the Iraqi Transitional Government.

Significant improvements in communications and information systems infrastructure were ongoing to provide more robust and reliable connectivity to warfighters and decision makers, which meant information was flowing. However, it became immediately clear that information flow did not ensure shared situational awareness and operational excellence. Standardized processes and systems were needed to make sense of all the information and provide a meaningful context for enhanced decision-making. Personnel were needed to provide structure for information capture, assessment and to exchange requirements and implement process changes to leverage new technology.

The MNF-I KM Division faced daunting challenges because a freewheeling information environment had resulted with little implementation of best practices for managing the authoritativeness, trustworthiness and value attributes of information. The temptation to leap into action implementing quick wins which could lead to long-term interoperability problems was palpable. But the KM team resisted and instead adopted the approach depicted in Figure 1.

The key to success was centered in evaluating the needs of internal and external personnel for information exchange. A questionnaire was developed to quiz staff on their frustrations, ideas, documents, data, information sources and how they collaborated with other staff members. Three distinct components influenced the assessment process based on the following assumptions.

• *The purpose of KM is to enable the creation, capture, organization and sharing of knowledge within an organization and external stakeholders. This principle was a KM team focus because at MNF-I there were many pressing operational tasks in support of the campaign plan competing for people's time.*

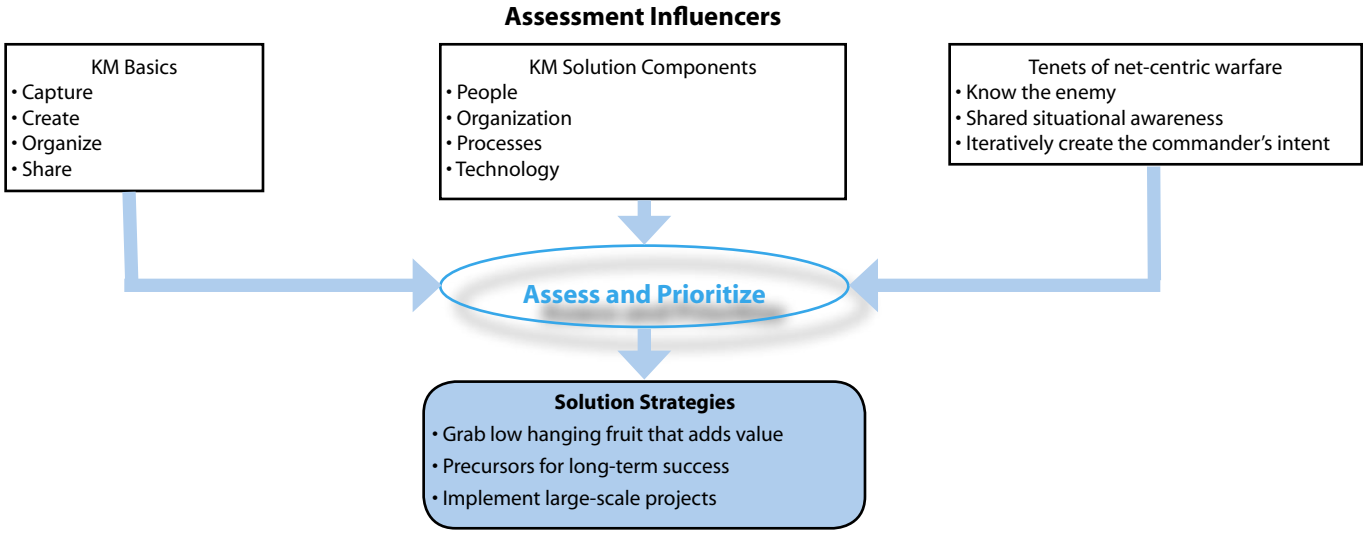

Figure1. MNF-I KM Team Initial Approach

• *All KM solutions or initiatives consist of four components: people, organization, processes and technology.*

• *Network-centric warfare conducted in a connected environment suggests that knowing the enemy is an overarching principle to success. This includes culture, religions, politics, economic landscape, etc.*

• *Shared situational awareness means more than tactical plots; it includes how MNF-I captures and shares events, such as assessing progress in economic development and measuring progress in building governance.*

• *Iteratively create the commander's intent by collectively understanding the commander's objectives, and help as a group to assist the commander create operational objectives in a spiral manner.*

The assessment paid rapid dividends. Besides providing input to the KM strategy, the team learned that continuous reassessment would have to be a part of the overall approach because of the 130 percent annual turnover rate of MNF-I personnel. The good news was that many members of the MNF-I staff were acquainted at least with process reengineering and already had good ideas that just needed the kind of help the KM team could provide to move them from concept to action. At the conclusion of the assessment, the KM team developed a three-step action plan.

The first step was to develop a KM strategy that included addressing long-term systemic knowledge sharing problems with parallel efforts to grab low hanging fruit. The team aligned strategy with the campaign plan and its four operations: security, governance, economic development and communications. It quickly became apparent that knowledge sharing was instrumental in synchronizing political, military and economic effects.

Once the overall KM strategy was created, short- and long-term enterprise solutions were formulated and executed. Plans were devised that used process and organizational changes, training, IM standards and technology to improve mission accomplishment. While long-term enterprise solutions were the priority to provide a framework for long-term success, quick organizational or process changes were targeted for immediate improvement. These parallel efforts, in compliance with the enterprise vision, would bring immediate benefits, required little or no funding and were achievable in a short time.

Grab low hanging fruit …

The KM Division understood the importance of good IM practices as a precursor to successful KM. The team began by looking at what could be done to improve IM at headquarters and with external organizations. Information management was a critical first step to efficiently and effectively provide the right information, to the right decision-makers, at the right time.

Some initiatives were simple, yet improved processes for a wide audience, such as revamping command indoctrination and developing a Web-based white pages directory tied to an electronic organizational chart, which made it easy to find personnel. A Web-enabled yellow pages directory made it easy to find people with subject matter expertise in more than 50 categories.

Mechanisms were devised to ensure consistent messages were distributed. For example, previously, there was no standard way to inform people of uniform upgrades because of a heightened security posture. It was so confusing that sometimes an e-mail about a change conflicted with information posted at guard stations. To eliminate confusion, the KM division purchased an electronic marquee system for Camp Victory South, the portion of Camp Victory that houses MNF-I headquarters and is home to several thousand personnel. Marquees were installed in areas where people congregated: chow halls, the gymnasium and Al Faw Palace. Messages were synchronized making information reliable and timely.

Some of the biggest challenges were IM deficiencies in data, the information architecture and the KM elements or organizations and processes that relied on them. The MNF-I staff is dispersed between two locations with much of the command in Al Faw Palace on Camp Victory (CV) and the Strategic Operations

Ground convoys on Route Irish are routinely attacked by insurgents using vehicle-borne or ground-planted improvised explosive devices (IEDs). Convoys typically require a protective detail of 8 to 10 people.

Portal equipment being delivered to Camp Victory. The Convoy Tracker Web service, chat and virtual meetings reduced the number of administrative ground convoys and risk to personnel.

Center (C3) in downtown Baghdad at the U.S. Embassy in the International Zone (IZ) four miles away. So ensuring command and control over the force can be facilitated by Web-enabling more information with a focus on process reengineering.

KM reduces the number of personnel at risk …

Prior to November 2004, most business was conducted in face-to-face meetings, which required travel on Route Irish, one of the most dangerous roads in Iraq. Ground convoys on this route are routinely attacked by insurgents using vehicle-borne or ground-planted improvised explosive devices (IEDs). The average convoy between Camp Victory and the IZ required a protective detail of 8 to 10 people and several hours to coordinate and conduct. In addition to the security risks and direct costs in terms of time and fuel, there were secondary costs, such as maintenance on vehicles and weapons, lost productivity during travel, etc.

Convoys were also uncoordinated centrally. Individual groups arranged convoys for administrative travel in a vacuum, unaware if others were doing the same. This created situational awareness deficiencies from a force protection standpoint and increased the possibility that more convoys than necessary were conducted. The KM team recognized that efficiencies could be realized by publicizing available seats and consolidating trips, thus conserving resources and significantly decreasing the likelihood of putting personnel at risk.

The KM team took a two-pronged approach to solve this problem. First, the KM team installed a collaborative tool server in the IZ with the help of the U.S. Joint Forces Command (USJFCOM) Standing Joint Force Headquarters (SJFHQ), which supplied the equipment, technicians and trainers. The server was federated with the server at Camp Victory to provide technology for virtual meetings with chat, Voice over Internet Protocol (VoIP), document sharing and whiteboard capabilities. Then the team conducted a training and awareness program marketing the tool as a way to reduce trips on Route Irish. The response was immediate and positive. Hundreds of people were trained to use collaborative tools for virtual meetings.

Secondly, a Convoy Tracker Web was established for personnel to sign-up online for available convoy seats for those that still needed to travel. This service further decreased the number of administrative ground convoys and risk to personnel.

Web services to the rescue …

One of the most comprehensive efforts was the realization of a Web services architecture and identification of authoritative data sources to improve the reliability of information for decision-makers and to share with the Iraqis.

Initial KM assessments revealed that there was no method to easily access or share information. While the KM team focused on immediate concerns, they also looked to the future to anticipate emerging information sharing needs. They realized that as the United States begins to turn over governance and security functions to the Iraqis over the next few years, there will be a need to securely transfer a large amount of releasable information to the Iraqis in a logical fashion. No information architecture, system or process had yet been planned to fulfill this requirement.

The existing MNF-I Web site was basically acting as a file server without any way to put the information in useful context. New data sources were cropping up like mushrooms without thought of what already existed. Many of the new databases were found to be wholly or partially duplicative of an existing source, which clouded the ability of operators to definitively trust information. The challenge was how to rein in all of these new initiatives to ensure that reliable information is easy to obtain.

The team drafted a data management strategy, an open standards portal requirements document and concept of operations to provide the means to overcome knowledge roadblocks. The portal was to be the user interface to Web services comprised of information from authoritative databases in a standard format using Extensible Markup Language (XML) with a standards-based messaging protocol, Simple Object Access Protocol (SOAP), for moving data.

These Web services would empower users to quickly and easily share information and enable security metadata tagging of information. The portal would also provide users with the ability to customize information and be notified of changes to data to improve collaboration. The portal architecture was designed with redundancy to replicate data properly tagged as releasable to the Iraqis' identically configured portal. Replication would be done iteratively, first with an air gap, and later with the capability for automatic transfer via an electronic data guard to be implemented once it received security accreditation.

The detailed portal and document management requirements generated by the MNF-I KM team were sent to about 10 organizations to see what solutions might fulfill command requirements. The USJFCOM Joint Experimentation (J9) Joint Prototype Pathway Branch was developing an open standards, open source portal as part of its Command Cross-Domain Collaborative Information Environment suite. It was selected by MNF-I to get the capability in theater in a compressed time frame. USJFCOM staff not only provided portal equipment, engineering and installation, they also provided several full-time developers to provide the initial Web services requested by MNF-I.

Additionally, USJFCOM SJFHQ prepared documentation for system users and trainers to ensure that successful system integration into the MNF-I environment was properly addressed.

Concurrently, the KM team inventoried and analyzed all databases at MNF-I, including all spreadsheets with more than 1,000 lines, to determine what data existed and who was using it. Best of breed data sources were selected and duplicative sources were eliminated. A comprehensive Information and Data Management Policy and Strategy were implemented laying out requirements for standards-based data formats and Web services to improve data reliability and interoperability throughout Iraq. Then functional data owners and managers were assigned to manage the authoritative data sources for the portal Web services that could be written.

Web services requirements were drafted including services to improve fragment orders writing, notification and search, strategic operations center briefing and administrative convoy tracking. These services were developed by USJFCOM J9. Four of these Web services have been fielded with others still in beta testing. The MNF-I Web services architecture and data management strategy were unprecedented and had immediate and positive impacts on strategic military operations in Iraq.

In all of these efforts technology was important, but the corresponding focus on awareness, process change and training was far more challenging and fundamental to making success achievable. Innovation was a basic tenet of the MNF-I knowledge management strategy. All assumptions were questioned as to why things were done a certain way. If a decision was made based on the circumstances of six months ago, the process was re-examined to determine if it was still germane. Because everything from the political situation, to warfare and personnel change every six to 12 months, it was imperative to constantly re-evaluate basic assumptions and propose new ways to conduct operations and warfare support processes.

Bringing everyone into the KM fold …

Since KM was a new concept for MNF-I, it was important to demonstrate how its concepts could be employed to directly benefit the warfighter. Understanding by key stakeholders and the command at large was critical to ensure changes of lasting value. The KM division devised a multifaceted approach for building awareness of the various KM initiatives, the importance of knowledge-enabled organizations and how sharing increases operational effectiveness.

To this end, team members fanned out among the staff popularizing the use of collaborative tools and assisting users in articulating their requirements for Web services. The requirements were then passed to engineers for development. Awareness training included such simple ideas as placing KM concepts on slides in conspicuous areas and key general officer workspaces.

The messages were hard to ignore and momentum for many of the KM initiatives soon built. Kindred spirits were discovered and leveraged across the staff. Briefings to senior leaders and key stakeholders were instrumental for securing "buy-in" for KM concepts and projects.

An organizational change for MNF-I that was essential to communicating information sharing requirements and solutions was creation of the directorate knowledge management officer (KMO). The KMO is similar in function to the information management officer (IMO) each directorate employed, so it was a construct that was easy to understand. The IMO is usually a collateral duty for an information technology savvy enlisted member or officer. The IMO assists the staff with basic computer and applications issues.

KMOs work across functional area boundaries to optimize applications and data structures, eliminate redundancies, facilitate collaboration and generally serve as information referees to ensure the integration of relevant and meaningful content into the portal. They also help users articulate trouble reports. The KM Division designed a rigorous training course and established a requirement for each directorate to assign a KMO. The KMOs provided feedback for issues to the core KM team and offered knowledge sharing opportunities generated in the various directorates.

The lessons learned and solutions fielded in Iraq were instrumental in building a military culture that includes knowledge management in every aspect of operations, not just as a separate KM function, but as an integral element of campaign success.

Rear Adm. Nancy Brown is currently vice director, Command, Control, Communications and Computer (C4) Systems, J6, Joint Staff, Washington, D.C. Brown returned in April from a seven-month deployment as the Deputy Chief of Staff for Communications and Information Systems at Multi-National Force-Iraq. Her assignment, as director for Command Control Systems, J6, North American Aerospace Defense Command and Director, Architectures and Integration, J6, U.S. Northern Command, Colorado Springs, Colo., is expected for Aug. 1, 2005.

Capt. Scot Miller is the commanding officer of the Navy Center for Tactical Systems Interoperability (NCTSI) in San Diego. He recently served six months as the first chief of the Knowledge Management Division under Rear Adm. Brown at Multi-National Force-Iraq.

Lt. Cmdr. Danelle Barrett is the communications officer on the staff of Carrier Strike Group Twelve. She recently served as the deputy knowledge manager at Multi-National Force-Iraq. CHIPS